



Development of Nonwoven Fabrics for Military Applications

Overview:

The United States Marine Corps has taken the initiative to develop state-of-the-art nonwoven composite fabric technology for use as alternate fabric application for Combat Utility Uniforms (CUU's), equipment, shelters etc. This effort is being conducted via a Small Business Innovative Research (SBIR) contract. The objective of the SBIR is to utilize latest nonwoven technology to enhance performance and reduce lifecycle costs for combat type clothing. Concept includes development of lightweight composite material that offers high durability, high breaking and tearing strength, breathability, and cost reduction to replace current woven uniform material. Included is to design a Fire Retardant (FR) fabric and heavy-duty fabric for tentage and equipment applications.

Description:

Typical woven fabrics use old textile technologies that are outdated and generally outsourced to other countries. It uses twisted yarn construction that has poor insulation, filtration and barrier properties, whereas nonwovens are only a few decades old and offer innovation and technological growth. Nonwovens are fabricated with finer individual fibers that are bonded and/or entangled to supply better insulation, filtration and barrier properties. The strength of nonwoven fabrics is that they can be engineered with specific properties but with higher production rate, wider width up to 120 inches and lower costing with potential for full automation.

Phase I studies indicated that nonwoven composite fabrics can be made 25% lighter and stronger than current woven military uniform fabrics. In addition, they can be made to exhibit over three times the air permeability or breathability of the current woven military uniform fabrics.

Phase II uniform fabric would offer enhanced abrasion resistance, develop a fire and chemical/biological resistant fabric and offer combination water repellent/moisture absorbent composite fabric.

Status:

Successful commercialization is the future of nonwovens. Getting people to accept nonwovens for clothing and general applications will be the key to success. Thus far, nonwovens are generally perceived as disposables with a harsh stiff hand and weak in nature. The goal of this SBIR is to break out of this mode and prove the concept through use of military applications.

Point of Contact:

Individual Protection Liaison

COMM: (508) 233-6481, DSN: 256-6481

E-MAIL: amsrd-nsc-ad-b@natick.army.mil

Woven Fabric Magnified



- Bigger fibers/ twisted strands
- Poor insulation, filtration and barrier properties

Nonwoven



- Finer Individual Fibers Bonded
- Better insulation, filtration and barrier properties

NATICK SOLDIER CENTER

Kansas St.
Natick, MA
01760
nsc.natick.army.mil

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